MARCH 1980
No. 3

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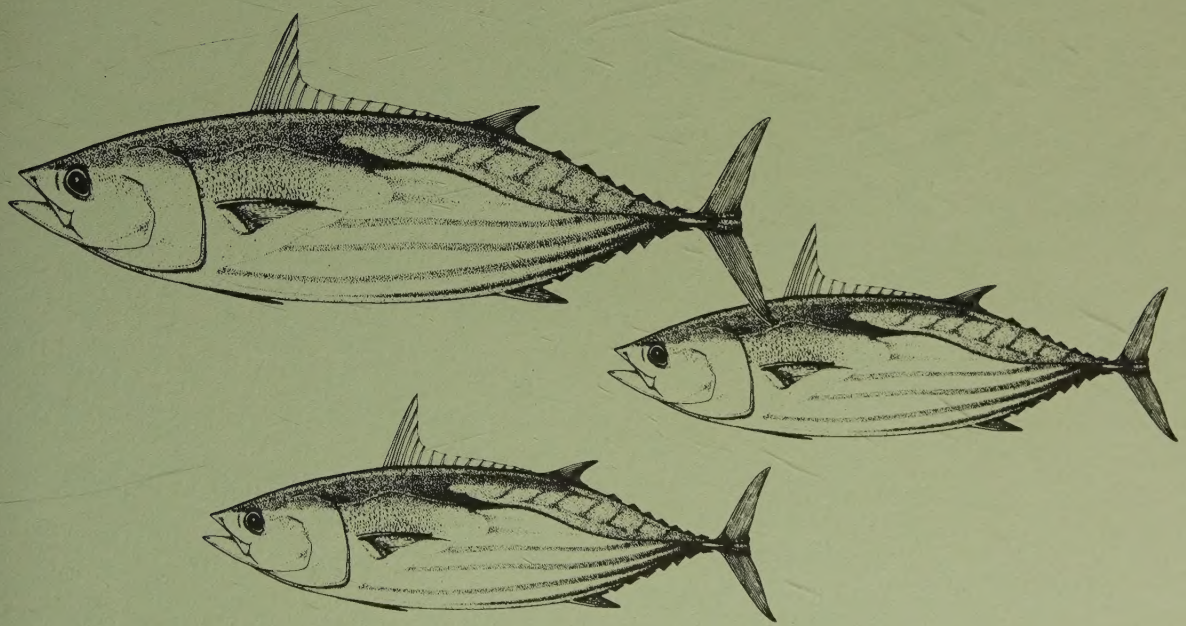
Southwest Fisheries Center-La Jolla, California



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FISHING INFORMATION

MARCH 1980, No. 3

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PREFACE

This publication, Fishing Information, appears monthly and contains 1) fishery advisory information, 2) a narrative description of pertinent surface temperature conditions, 3) charts of winds and pressures for the eastern North Pacific, 4) charts of sea surface temperature for the North Pacific and eastern tropical Pacific, and 5) charts of subsurface temperature structure in the eastern North Pacific.

A supplement to Fishing Information appears at 15-day intervals throughout the year. It contains a chart of sea surface temperature (contoured at $2^{o}F$ ($1^{o}C$) intervals) from Baja California to Vancouver Island out to about $135^{o}W$. Special bulletins are published in conjunction with the 15-day sea surface temperature charts which include short-term projections of albacore distribution and locations of productive fishing areas, information on oceanographic and atmospheric conditions, and other information as is appropriate during the albacore fishing season.

To cancel delivery of this publication in the event you no longer need to receive it, or to change the delivery address if you are moving but still need to receive it, please notify us by writing: James A. Renner, Editor, Fishing Information, National Marine Fisheries Service, Southwest Fisheries Center, P. O. Box 271, La Jolla, California 92038.

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ENVIRONMENTAL CHARTS ANALYZED BY:

F. Miller (Figures 8 and 9)
J. Renner (Figures 1, 2, 3, 4, 5, 6, 7, and 15-day Supplement)

TECHNICAL EDITOR:
R. Allen

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  J. Redhead at Langara Island Light;
  R. Dobinson at Cape St. James Light;
  R. W. Moe at Kains Island Light;
  M. V. Stewart at Amphitrite Point Light

Scripps Institution of Oceanography, La Jolla, California

Sea Surface Temperature and Environmental Conditions

Forrest R. Miller

Eastern North Pacific

During March the Aleutian low pressure center is normally weaker than during the winter months and shifts eastward over the southern part of Alaska between 150°W and 170°W. The subtropical high pressure center is normally located near 30°N, 145°W (Figure 1). Between the Aleutian low and high pressure systems, storms develop and move eastward reaching the United States' west coast with less intensity than during February.

In March 1980 the Aleutian low was centered near 55°N in the Bering Sea. The low moved northward after February to about 700 miles west of its normal position. The subtropical high pressure center moved back to its normal position (Figure 2). Thus, the major weather systems in the Pacific were located closer to normal positions during March than in January and February 1980. A high pressure ridge extended northeastward from the Center to Washington and Oregon and diverted most of the heavy weather northward over British Columbia. The heaviest storm activity and ocean wind mixing developed over the central Pacific from 35°N to 45°N and moved northeastward into the Gulf of Alaska. Storm activity and ocean wind mixing was relatively light along the United States' west coast during most of March.

Because of the southerly displacement of the Aleutian low during February, there were no well marked ocean temperature boundaries north of 30°N (Figure 3). However, along 40°N west of 150°W the north Pacific Ocean temperature front appeared to be developing at the surface again. In the central Pacific, the area covered by SST's more than 1°C below normal decreased in size and shifted northeastward from February to March (Figure 5). This occurred because the Aleutian low and Pacific high pressure systems moved back toward their normal positions. Also, the heaviest wind mixing and storm activity took place east of 170°W from 35°N to 45°N. South of 30°N the SST's remained below normal, but negative departures were less than in February 1980. In the Gulf of Alaska and east of 140°W, SST's were above normal as they have been for the past 8 months. The very large area west of Baja California with SST's greater than 1°C above normal continued to provide a surplus of heat energy for the atmosphere. As the Pacific high pressure system moved back to its normal position and strengthened, the northeast trade winds increased once again. As a result, the positive SST departures decreased to less than 1°C over several small areas between Baja and 140°W. The patterns of positive and negative SST differences between March 1980 and March 1979 (Figure 7) were similar to the normal departures in Figure 5. The largest exception was from 40°N into the Gulf of Alaska along 145°W where SST's were about 1°C warmer than a year ago.

Western North Pacific

The Aleutian low pressure system normally extends into the western Pacific north of 40°N in March. Storms develop east of Japan along the southern periphery of the Aleutian low and move rapidly eastward between 30°N and 40°N. The subtropical high pressure system usually extends across the entire western Pacific along 30°N.

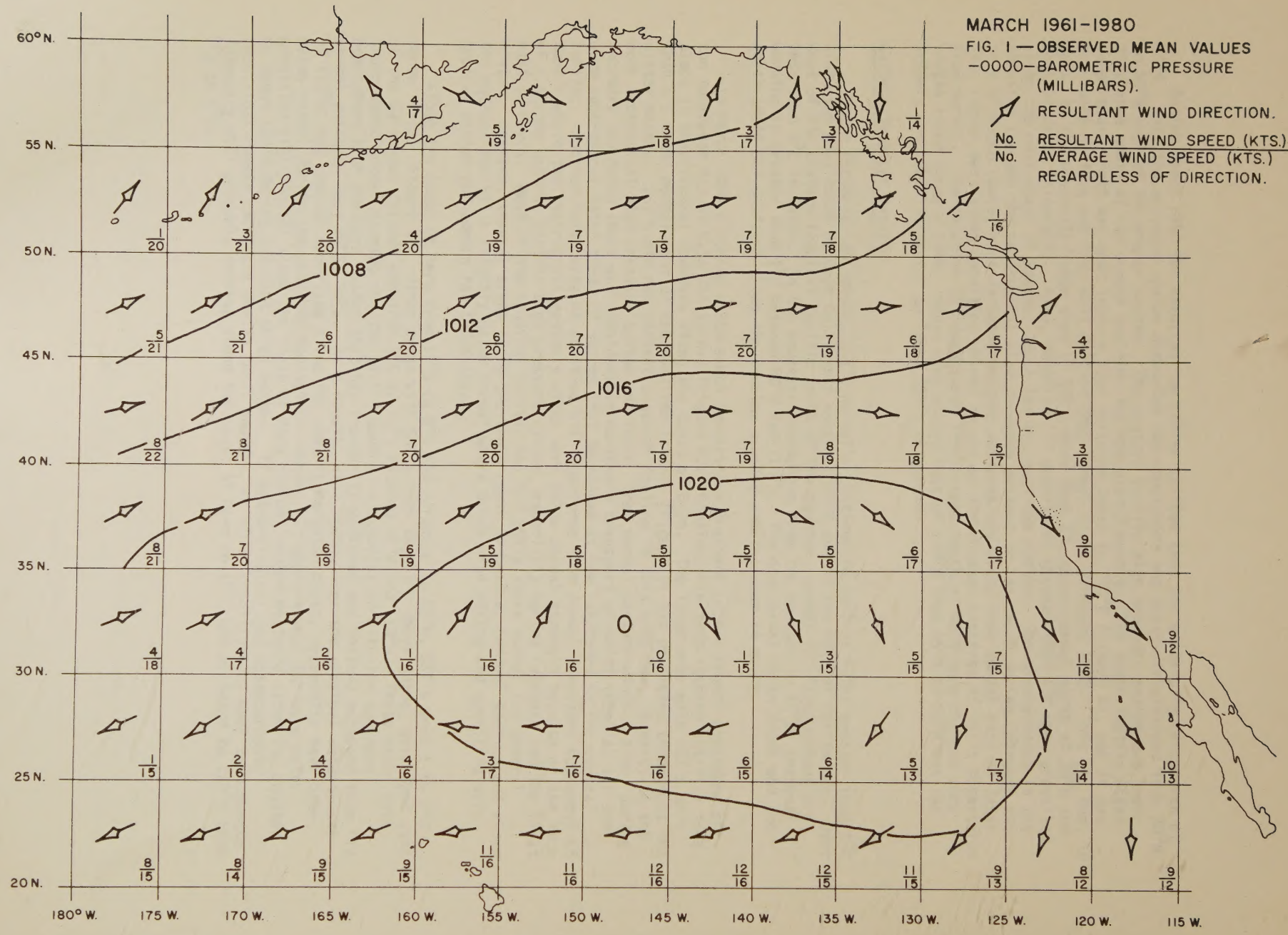
During March 1980 the Aleutian low center shifted into the western Pacific north of 50°N. This low pressure system dominated the atmosphere and ocean circulations from 30°N to 60°N most of the winter months. The western Pacific high pressure system has been displaced south of its normal position for the past 3 months. The north Pacific Ocean temperature front was most intense from northern Japan to 170°E (Figure 4), but it has been more diffuse and less well defined than normal since February 1980. This was due, in part, to the unusually large area of SST's more than 1°C above normal north of 30°N and east of Japan (Figure 6). Also, negative SST departures greater than 1°C have prevailed along the east coast of Honshu, Japan for the past two months. The displacement in the Aleutian low and the subtropical high pressure systems to the south during February and part of March caused more variable weather patterns and winds than normal east of Japan. This rather persistent condition helped to set up the unusual patterns of SST's departures from normal. The negative SST departures from normal south of 35°N have changed very little since January 1980. Ocean wind mixing east of 150°E from 25°N to 35°N was the primary contributing factor to lower SST's (Figure 6).

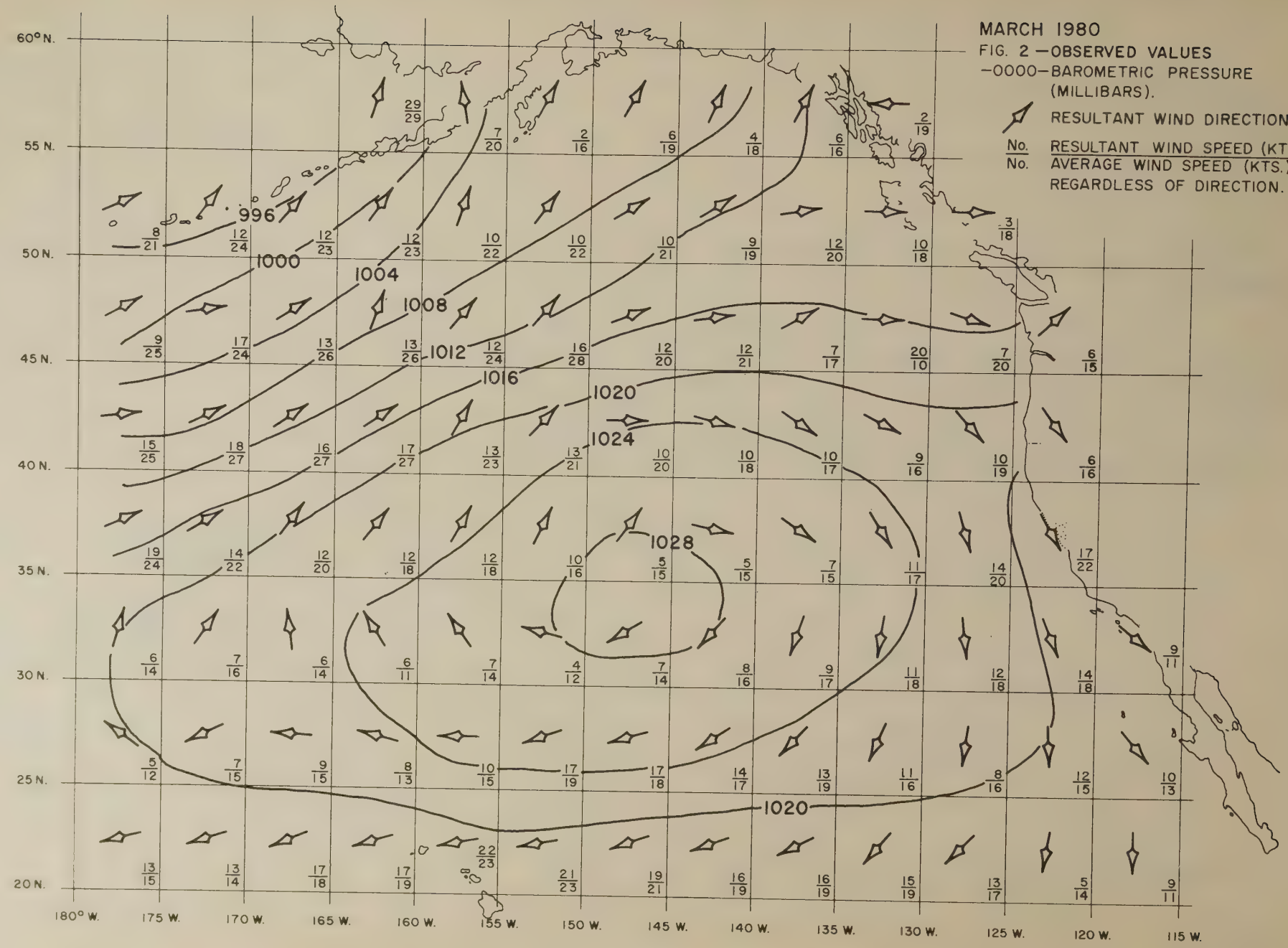
Eastern Tropical Pacific

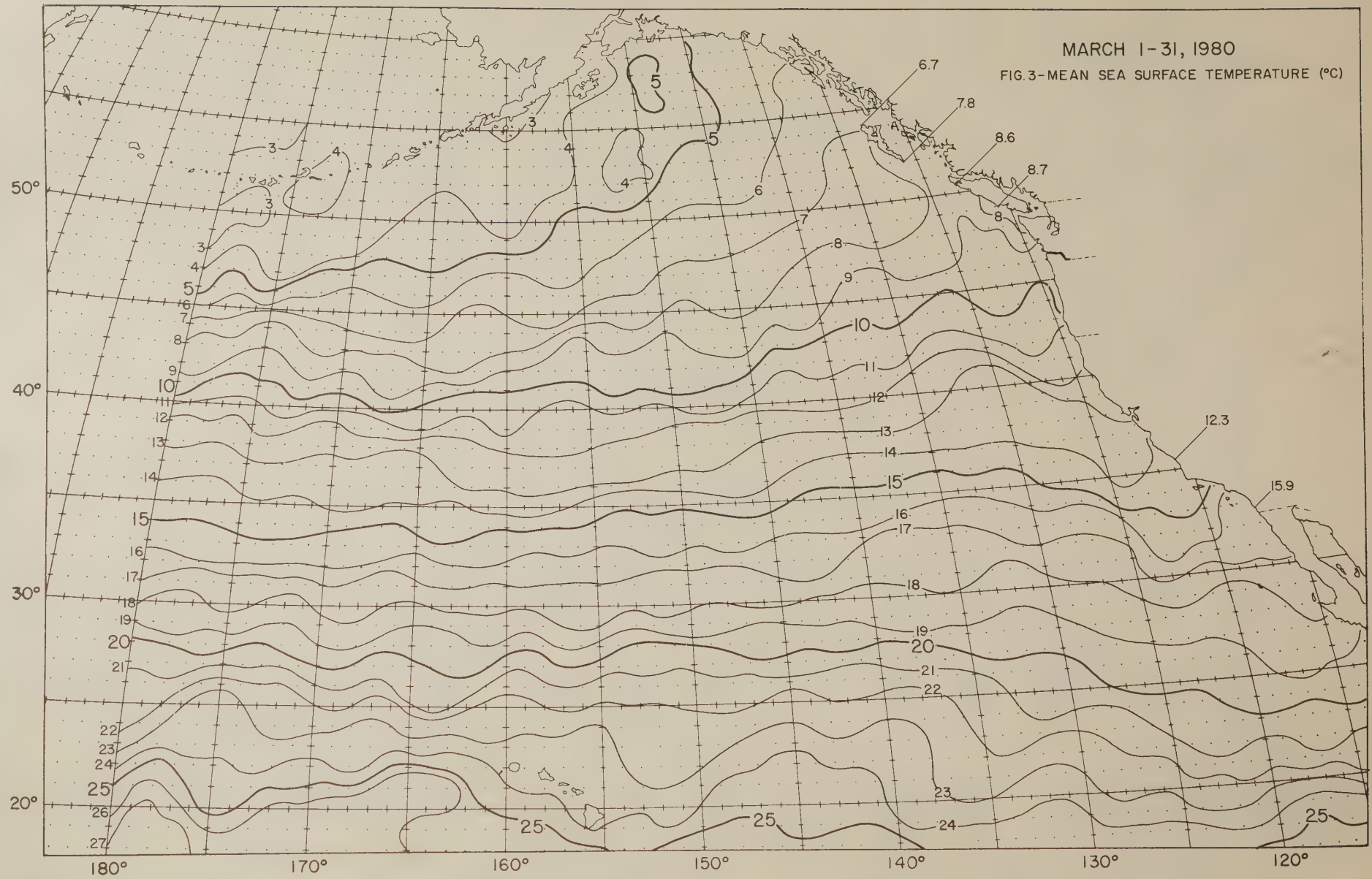
In the northern hemisphere, SST's normally continue to cool at rates greater than 1°C along the west coast of Baja California south of 25°N and in the Gulf of California. Over most of the eastern tropical Pacific north of the equator, normal SST fluctuations are less than 1°C in March. In the southern hemisphere from the equator to 10°S, seasonal warming is greater than 1°C between 85°W and 110°W. The equatorial ocean front and the north-south SST gradient along the equator usually remains weak in March.

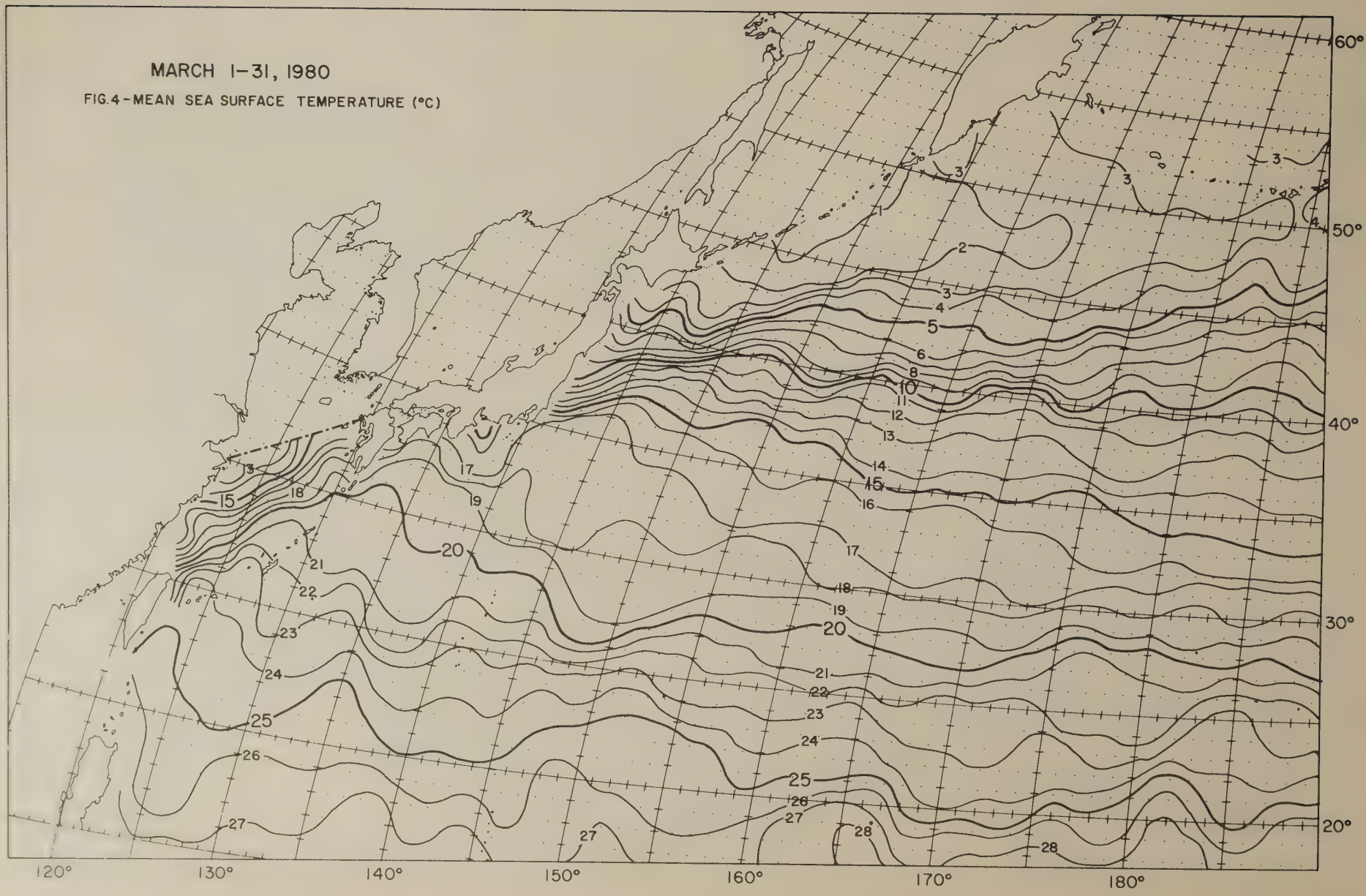
In March 1980 a strong north-south temperature gradient (ocean front) developed off the southwest tip of Baja California (Figure 8). Considerable tuna fishing activity took place in this frontal boundary along the coast of Baja. The large area with SST's more than 1°C above normal east of the Hawaiian Islands (Figure 9) has persisted throughout the winter months. SST's did not reflect seasonal cooling in this area due, in part, to the weak subtropical high pressure system and lower than normal surface winds. Also, during February and March there was considerable northward transport of moist tropical air and warm subtropical water ahead of storms that developed at low latitudes in the central Pacific. Another large area of positive SST departures from normal developed southwest of Hawaii where the subtropical easterly winds were below normal strength because of the lack of a strong central Pacific high pressure system, especially during February and the first half of March. Most of the tropical Pacific has had SST's above normal for several months. However, several areas along the south coast of Mexico, Central America and along the equator had SST's slightly below normal where ocean wind mixing and upwelling were typical winter phenomenon for those areas.

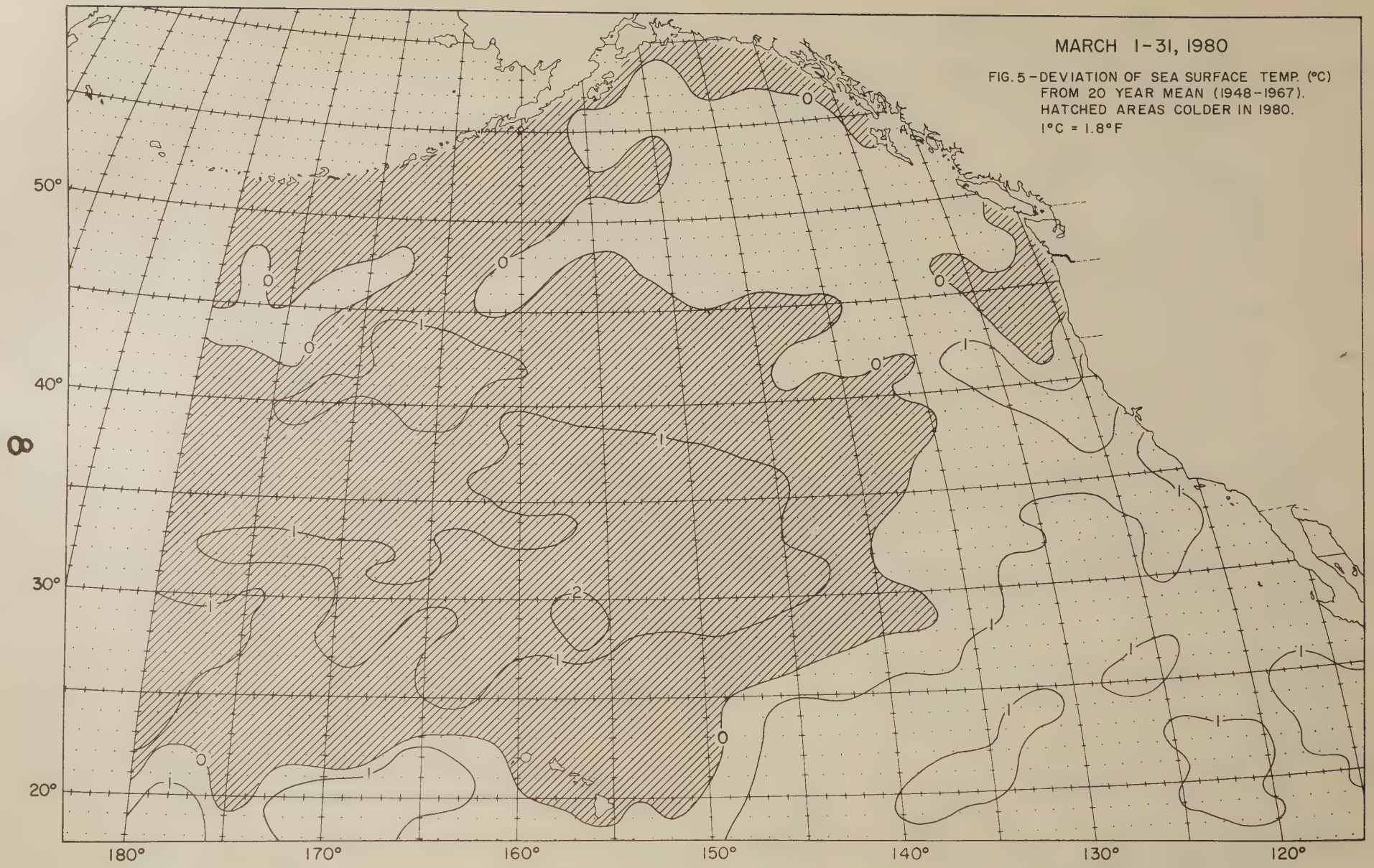
Along the coast of Peru from 15°S to 8°S and offshore to 85°W, SST's were 1 to 2°C above normal (Figure 9). Other areas with SST's more than 1°C above normal developed east of the Galapagos Islands and from 5°S to 10°S between 95°W and 110°W. These areas have shown above normal warming for the past 3 months in association with the southern hemisphere high pressure system that has frequently weakened and shifted westward from its normal position near 30°S, 90°W. As a result, wind mixing over the tropical waters east of 110°W, and coastal upwelling along the central Peruvian coast, apparently have been below normal during the southern hemisphere summer. It appears that the warm water condition will prevail along the coast of Peru and may expand westward along the equator to about 120°W during the next three months. If meteorological and oceanographic conditions remain unchanged during April and May, El Niño conditions of weak to moderate intensity will probably develop along the coast of Peru to 15°S and westward to 120°W from 5°N to 5°S.

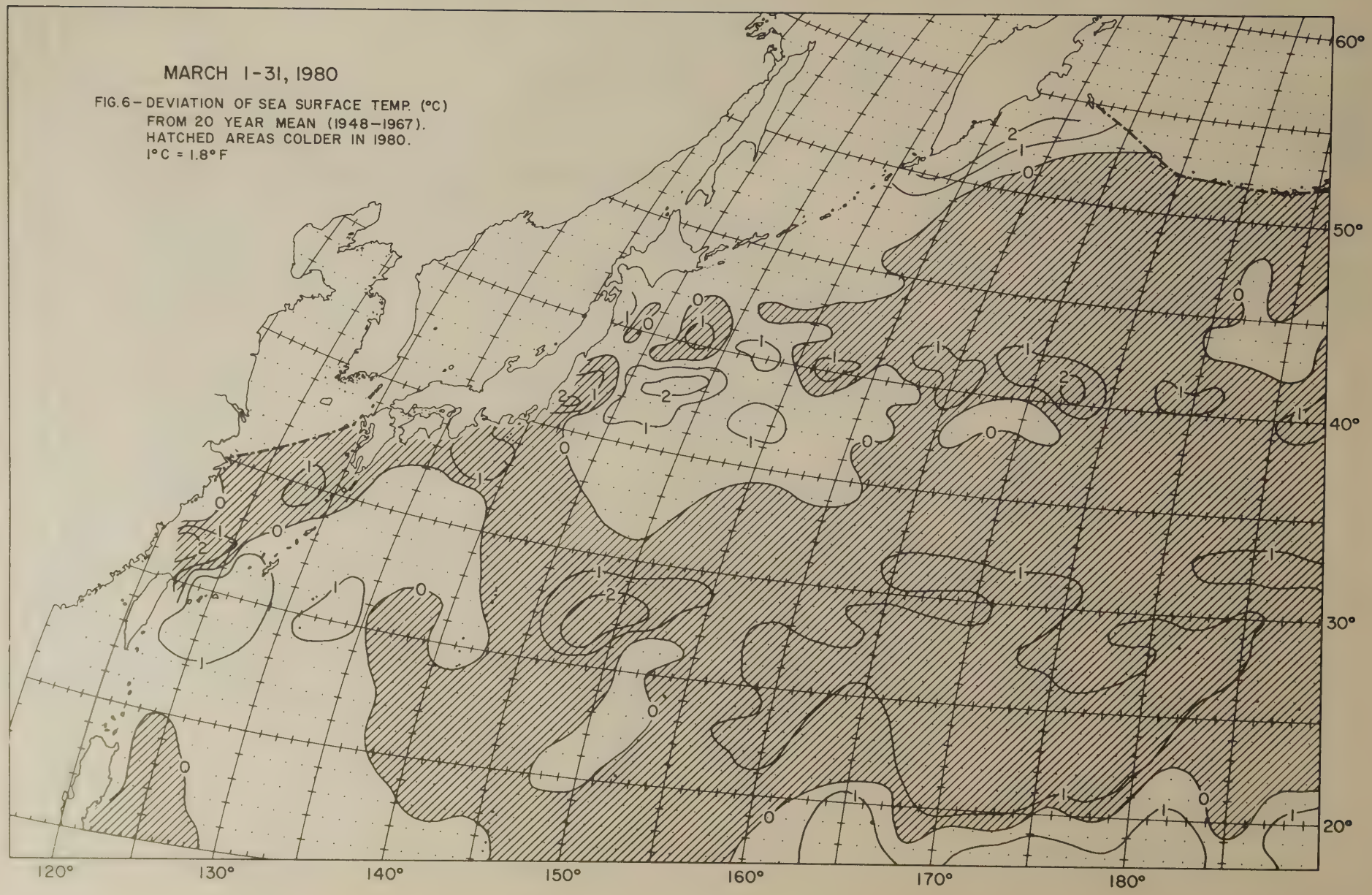

MARCH 1961-1980
FIG. 1 — OBSERVED MEAN VALUES
-0000- BAROMETRIC PRESSURE (MILLIBARS).
RESULTANT WIND DIRECTION.
No. RESULTANT WIND SPEED (KTS.)
No. AVERAGE WIND SPEED (KTS.) REGARDLESS OF DIRECTION.
1008
1012
1016
1020
60° N.
55 N.
50 N.
45 N.
40 N.
35 N.
30 N.
25 N.
20 N.
180° W.
175 W.
170 W.
165 W.
160 W.
155 W.
150 W.
145 W.
140 W.
135 W.
130 W.
125 W.
120 W.
115 W.

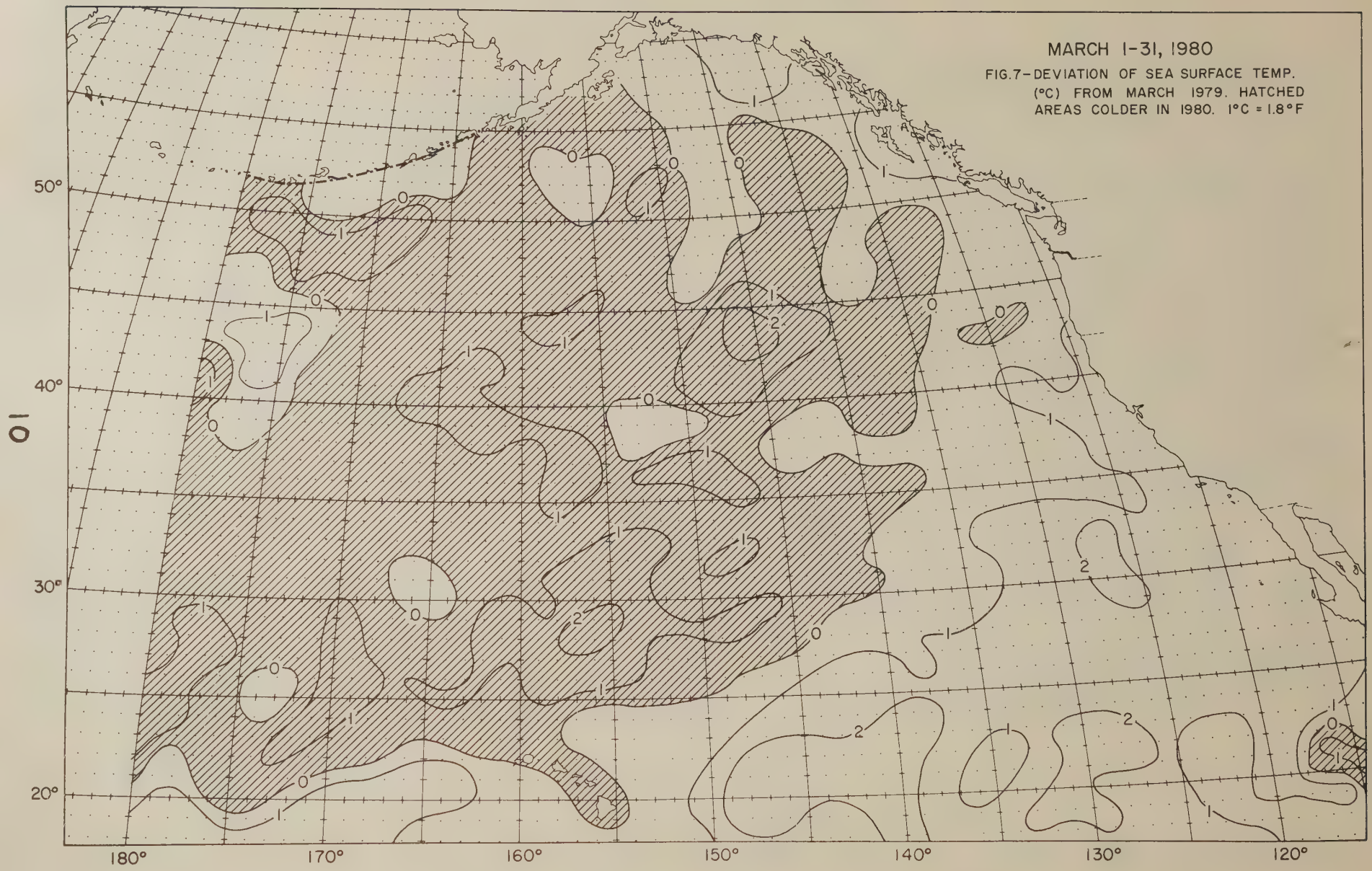

MARCH 1980
FIG. 2 —OBSERVED VALUES
—0000—BAROMETRIC PRESSURE (MILLIBARS).
RESULTANT WIND DIRECTION.
No. RESULTANT WIND SPEED (KTS.)
No. AVERAGE WIND SPEED (KTS.) REGARDLESS OF DIRECTION.
996
1000
1004
1008
1012
1016
1020
1024
1028
1020
60° N.
55 N.
50 N.
45 N.
40 N.
35 N.
30 N.
25 N.
20 N.
180° W.
175 W.
170 W.
165 W.
160 W.
155 W.
150 W.
145 W.
140 W.
135 W.
130 W.
125 W.
120 W.
115 W.

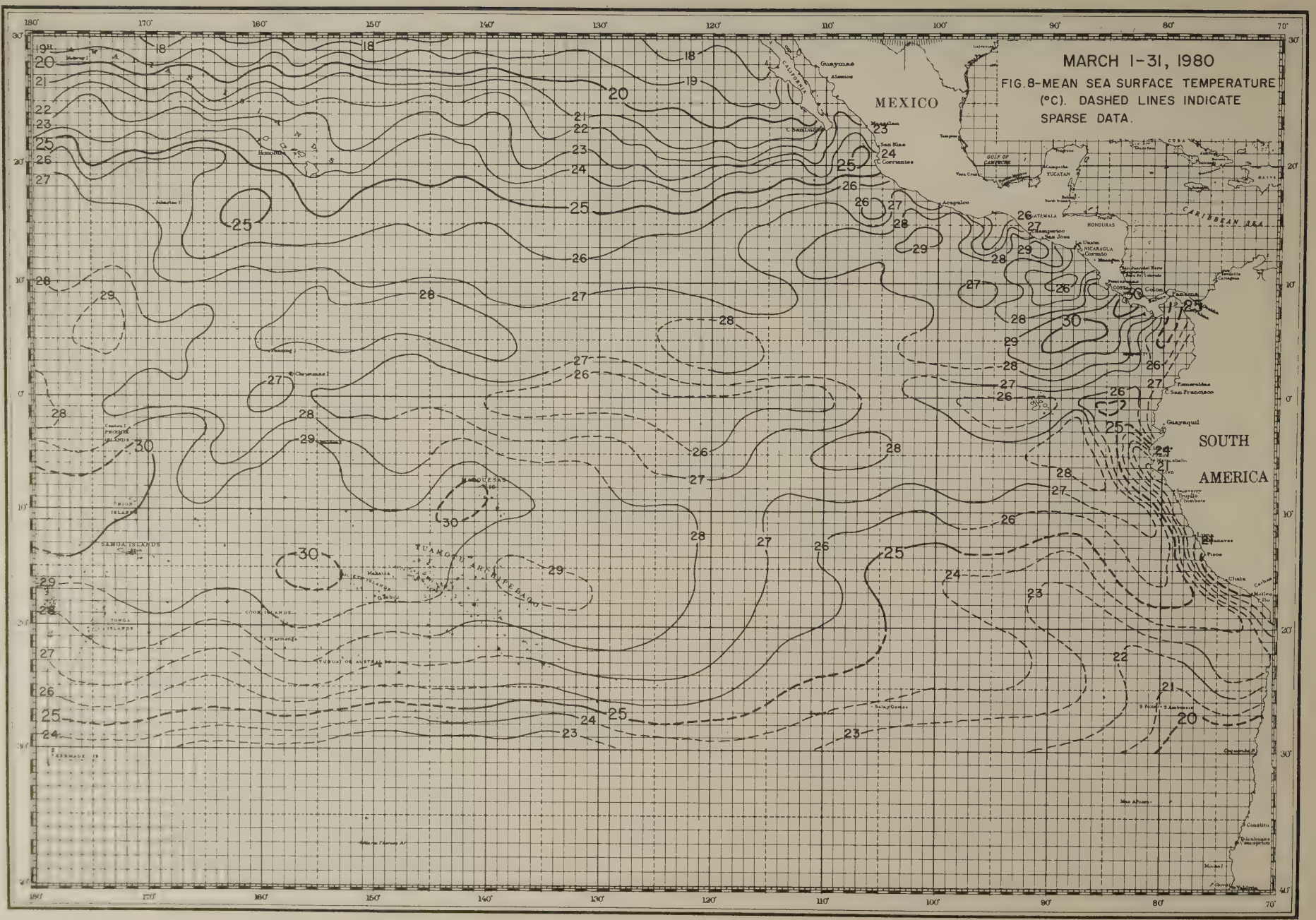

MARCH 1-31, 1980
FIG.3-MEAN SEA SURFACE TEMPERATURE (°C)
50°
40°
30°
20°
180°
170°
160°
150°
140°
130°
120°
6.7
7.8
8.6
8.7
12.3
15.9

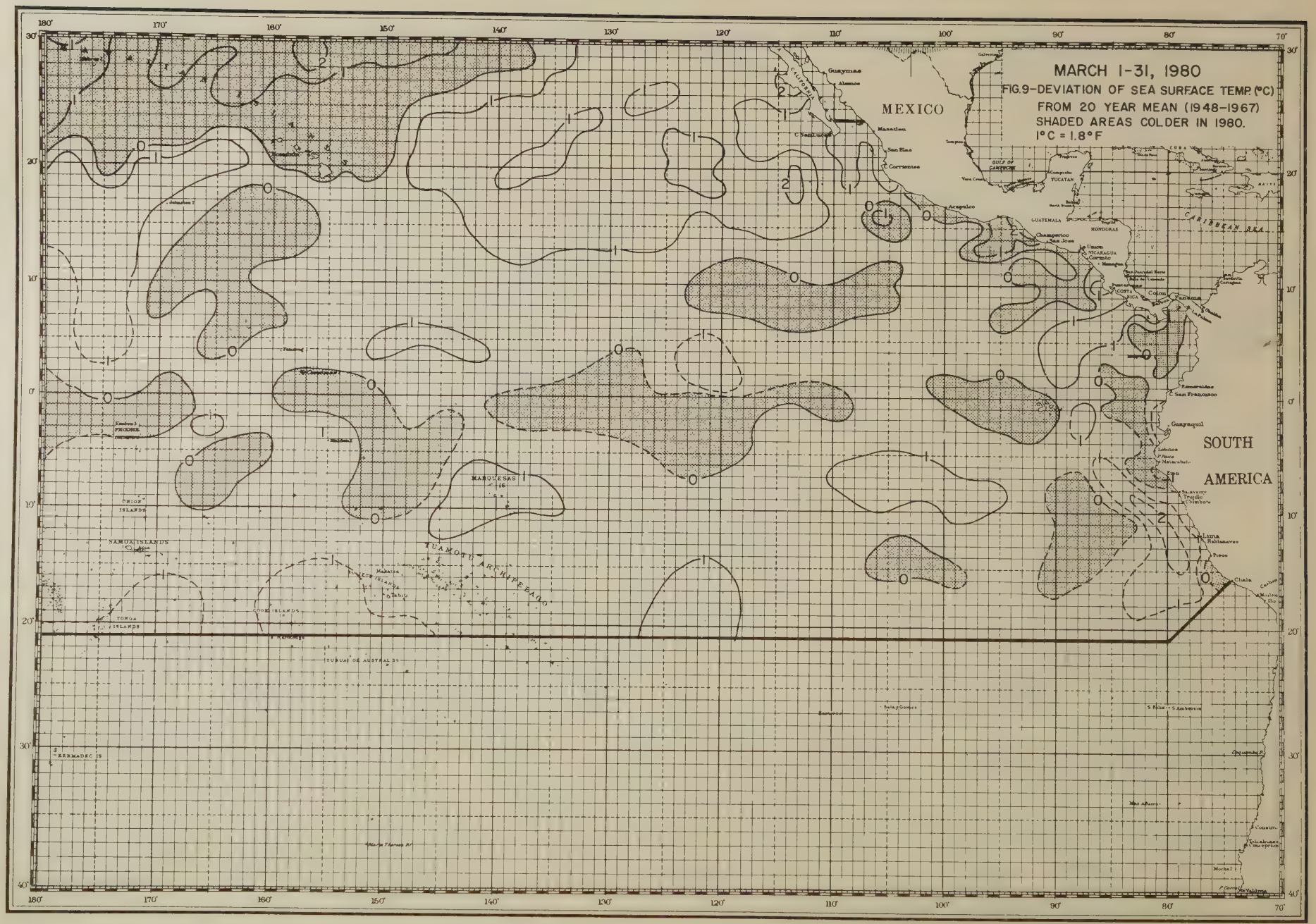

MARCH 1-31, 1980
FIG.4-MEAN SEA SURFACE TEMPERATURE (°C)
60°
50°
40°
30°
20°
120°
130°
140°
150°
160°
170°
180°


MARCH 1-31, 1980
FIG. 5 - DEVIATION OF SEA SURFACE TEMP. (°C) FROM 20 YEAR MEAN (1948-1967). HATCHED AREAS COLDER IN 1980.
1°C = 1.8°F
50°
40°
30°
20°
180°
170°
160°
150°
140°
130°
120°
0
1
2

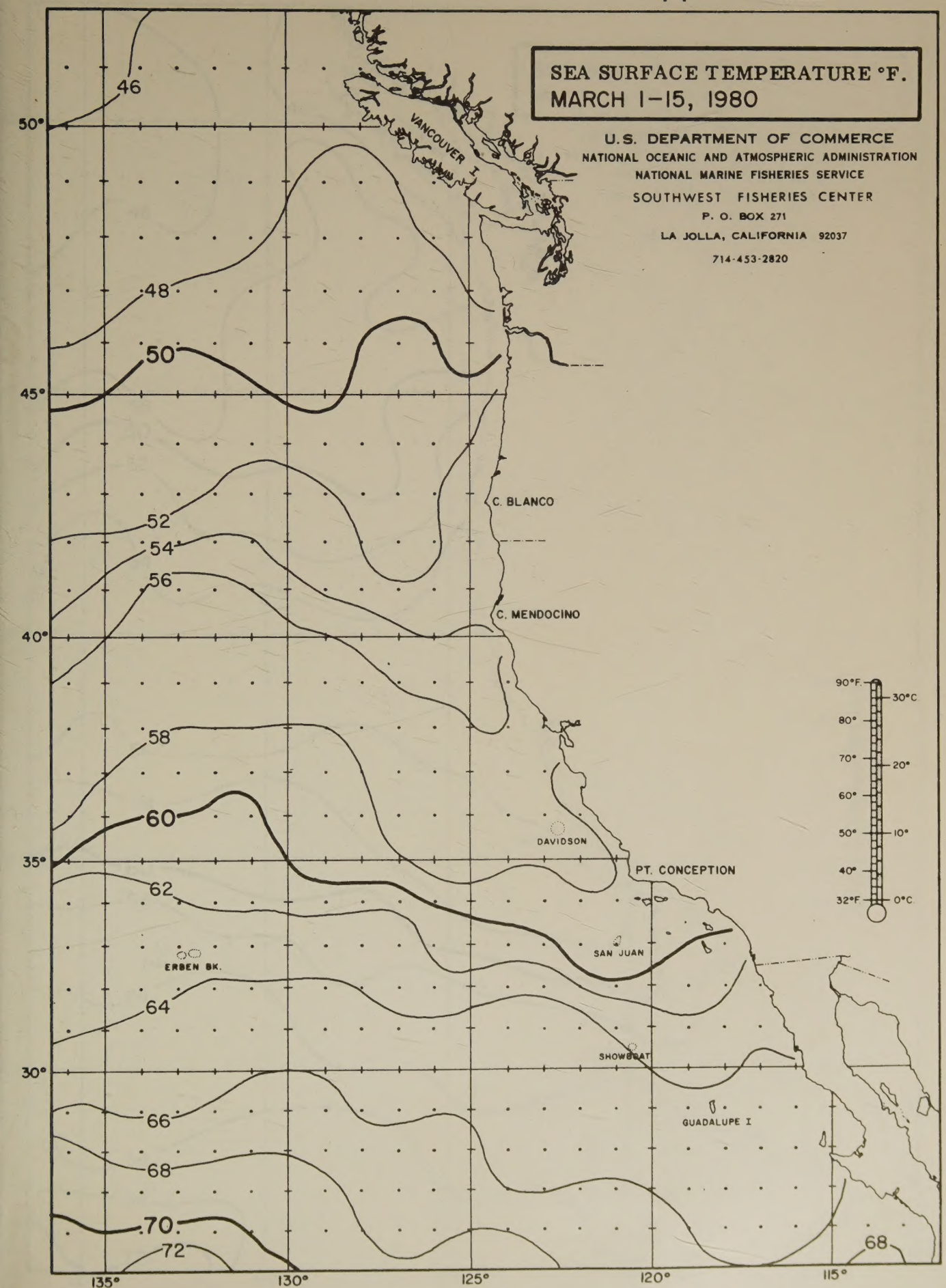

MARCH 1-31, 1980
FIG. 6 – DEVIATION OF SEA SURFACE TEMP. (°C) FROM 20 YEAR MEAN (1948–1967). HATCHED AREAS COLDER IN 1980. 1°C = 1.8°F
60°
50°
40°
30°
20°
120°
130°
140°
150°
160°
170°
180°

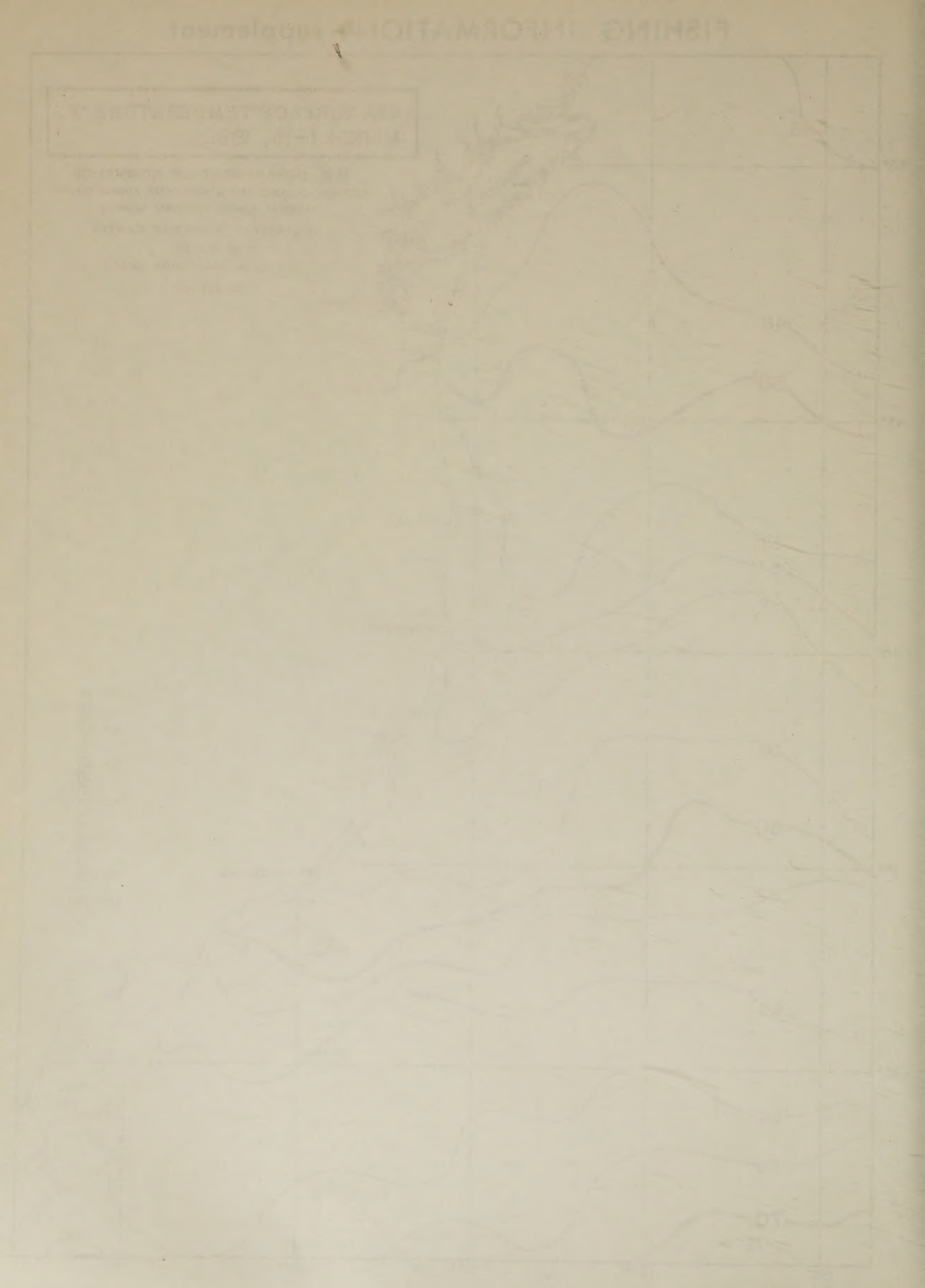

MARCH 1-31, 1980
FIG.7-DEVIATION OF SEA SURFACE TEMP. (°C) FROM MARCH 1979. HATCHED AREAS COLDER IN 1980. 1°C = 1.8°F
50°
40°
30°
20°
180°
170°
160°
150°
140°
130°
120°


MARCH 1-31, 1980
FIG.8-MEAN SEA SURFACE TEMPERATURE (°C). DASHED LINES INDICATE SPARSE DATA.
MEXICO
SOUTH AMERICA
CARIBBEAN SEA
GUATEMALA
HONDURAS
NICARAGUA
COSTA RICA
PANAMA
YUCATAN
GULF OF CALIFORNIA
Guaymas
Mazatlan
San Blas
Acapulco
Champerico
San Jose
Corinto
Colon
Esmeraldas
Guayaquil
Salaverry
Trujillo
Chimbote
Lima
Callao
Pisco
Chala
Arica
Iquique
Mollendo
Ilo
Tacna
Antofagasta
Coquimbo
Valparaiso
Talcahuano
Concepcion
Corral
Puerto Montt
Chiloe I.
Juan Fernandez Is.
Easter I.
Galapagos Is.
Cocos I.
Clipperton I.
Revillagigedo Is.
Socorro I.
Christmas I.
Phoenix Islands
Union Islands
Samoa Islands
Tonga Islands
Cook Islands
Tuamotu Archipelago
Marquesas Is.
Tahiti
Moorea
Raiatea
Tubuai Is.
Austral Is.
Rapa
Mangareva
Salas y Gomez
Sala y Gomez
Nazca
Ica
Pisco
Chala
Arequipa


MARCH 1-31, 1980
FIG.9-DEVIATION OF SEA SURFACE TEMP.(°C)
FROM 20 YEAR MEAN (1948-1967)
SHADED AREAS COLDER IN 1980.
1°C = 1.8°F
MEXICO
SOUTH AMERICA
CARIBBEAN SEA
MARQUESAS
TUAMOTU ARCHIPELAGO
SAMOA ISLANDS
TONGA ISLANDS
COOK ISLANDS
TUBUAI OR AUSTRAL IS
KERMADEC IS
Guaymas
Mazatlan
San Blas
Acapulco
GUATEMALA
HONDURAS
NICARAGUA
COSTA RICA
Panama
Guayaquil
Lima
Callao
Chala
Salaverry
Trujillo
Chimbote
Paita
Talara
Tumbes
Manzanillo
San Francisco
Easter I.
Tahiti
Raiatea
Huahine
Moorea
Rarotonga
Aitutaki
Penrhyn
Manihiki
Suwarrow
Nassau I.
Pukapuka
Rakahanga
Nanumea
Nanumanga
Niutao
Funafuti
Nukufetau
Nukulaelae
Vaitupu
Nanumea
Niulakita
Rotuma
Fiji
Suva
Nandi
Lautoka
Savusavu
Levuka
Kandavu
Rabi I.
Viti Levu
Vanua Levu
Taveuni
Lakeba
Koro
Ovalau
Yasawa Is.
Mamanuca Is.
Lomaiviti Is.
Lau Is.
Kadavu I.
Rotuma I.
Wallis I.
Futuna I.
Alofi
Niue I.
Tonga
Nuku'alofa
Vava'u
Ha'apai
Eua I.
Tongatapu
Niuafo'ou
Tafahi I.
Niuatoputapu
Minerva Reefs
Malden I.
Flint I.
Vostok I.
Caroline I.
Starbuck I.
Jarvis I.
Palmyra I.
Kingman Reef
Fanning I.
Christmas I.
Washington I.
Tabuaeran
Kiritimati
Teraina
Tabuaeran
Malden I.
Caroline I.
Vostok I.
Flint I.
Starbuck I.
Jarvis I.
Palmyra I.
Kingman Reef
Fanning I.
Christmas I.
Washington I.
Tabuaeran
Kiritimati
Teraina
Tabuaeran

FISHING INFORMATION – supplement





FISHING INFORMATION – supplement